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Article

Measuring Shared Social Appreciation of Community Goods: An Experiment for the East Elevated Expressway of Rome

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Abstract: Many large projects held over the last few decades in Europe have been based on the enhancement of community goods as a strategy to put in place sustainable urban regeneration. The inclusive nature of these goods and the social importance of the related decision-making processes suggests the need to involve the relevant community and to take into account its intentions and wishes regarding planning and organization. Therefore, before even starting to plan possible interventions, it is crucial to know what the members of the community think about the good in terms of social appreciation, in order to achieve socially sustainable choices. This paper offers a method to measure the social appreciation of community goods and describes the following: (a) deliberative esteem value technology to measure the social appreciation based on a combination between stated preference techniques and deliberative methods; (b) the criterion and methodology of the valuation technique proposed; and (c) an experimental application of the valuation technique pertinent to the specific case of the East Elevated Expressway of Rome.

Keywords: deliberative esteem value; community goods; sustainable urban regeneration; sustainable decisions

1. Introduction

The decision-making processes related to new forms of urban transformation postulate three fundamental hypotheses: (a) the enhancement of community goods strictly based on sustainability to be considered as a fundamental strategy for the implementation of projects capable of reconnecting economic growth with social promotion and environmental safeguard; (b) the involvement of the relevant community in every aspect of the enhancement project given the civic and inclusive nature of community goods; and (c) the importance of measuring the shared social appreciation of these goods that is a prerequisite to reconnecting the economic, social and environmental factors in a fully-integrated and sustainable manner.

The paper describes the following:

- The use of deliberative esteem value technology (DEVT) to measure the shared social appreciation of community goods;
- The criterion, methodology and instruments utilized as well as the principal phases of the valuation technique proposed;
- An experimental application of the technique, based on a role-playing game, to a hypothetic enhancement of the East Elevated Expressway in Rome falling into disuse.

The enhancement of community goods as a strategy to put in place urban, environmental, social and economic regeneration projects has been the driving force behind many of the large-scale schemes fostered in Europe over the last few decades. In recent years, the social demand for shared and relational goods has increased considerably, while at the same time, existing goods have gradually fallen into decay [1]; this implies the urgent need to regenerate and enhance existing goods of this kind through choices capable of increasing social wellbeing despite persistent economic stagnation and a growing weakening of social ties.

From an economic point of view, the very nature of these goods that are indivisible, non-rival and do not create exclusion as far as their utilization is concerned suggests the need to involve the users themselves in the decision-making processes regarding their enhancement. In order to do so, traditionally used criteria, procedures and instruments need to be reconsidered, and the role of the people involved needs to be modified. To this end, new approaches have been conceived to include communities in consensus-building activities and decision-making processes to achieve a shared choice regarding the necessary interventions, which are no longer exclusively delegated by the state and/or market, but are based on the preferences stated by the citizens interested in resources of this kind.

The inclusion of civil society in the decision-making processes regarding the enhancement of community goods reduces the likelihood of projects and schemes not being implemented due to the lack of consensus and/or disputes between policy-makers and civil society. Therefore, before even starting to plan possible interventions, it is crucial to know if, and to what extent, the community in question attaches importance to the good taken into consideration in this paper.

In order to provide a technique which allows the measurement the shared social appreciation of a community good, we propose the contents of the deliberative esteem value and the first results of an experimental application of this technique.

2. The Deliberative Esteem Value Appraisal: Criterion, Methodology and Tools

Measuring the shared social appreciation of a community good implies that its relative economic value (a) is indicated directly by the community that show interest in the resource; (b) can be calculated by examining the various economic properties of the good; (c) is recognized by the various stakeholders, and (d) will last in the mid-to-long term and extend to the territory where the user community lives.

The importance of reaching a shared valuation is justified by the fact that an economic value of this type is the result of individual actions triggered within a framework of relational, institutional and environmental ties. In this regard, the wellbeing of an individual reconnects to the wellbeing of the community to which he or she belongs.

The requisite of social sharing indicates the emergence of a new model of development that can be defined both as sustainable and integral because it is well balanced in terms of its economic, social and environmental components and founded on material, institutional and cultural growth. The sharing factor is an innate element of the innovative and integrative pathway that needs to be taken to relaunch a mature economy with the aim of combining economic growth with social cohesion.

2.1. The Esteem Value Criterion

Since shared social appreciation of a community good cannot be ascribed solely to the senses of value linked to cost, exchange or use, it can be linked to an economic value stemming from the importance that the valuing subjects are willing to attach to it (appraised singly and not together with other goods) and treated objectively as a quality of that being esteemed [2]. The valuation criterion of an economic value of this sort is an absolute and objective esteem value measured in monetary terms that are the result of a specific valuation procedure that takes into account multiple and variable needs and preferences. It is important to keep in mind that the economic value of a good is neither a necessary nor a perennial premise as it is attributed over time by humankind.

It follows, therefore, that in order to formulate the esteem value in question, it is necessary to take into account the social perception of the effects produced by the combination of different kinds of causality: (a) factors linked to utility (active and passive), including those identifiable in principles of sustainability; and (b) factors linked to the shortage of naturally scarce goods or goods with limited availability due to high cost prices (if producible) and to the market (if tradeable) [3].

When measuring the shared social appreciation of a community good, there are at least three reasons to advocate the utilization of a monetary valuation even if combined with other forms of valuation: (1) the possibility not only to verify a preference but also to quantify it; (2) the appreciation of a project of collective interest expressed in monetary terms is easier to communicate and to understand; (3) the monetary value of a community good can be used as a benchmark to quantify the amount of public funds to be invested, to quantify the issuance of bonds or the introduction of dedicated taxation instruments and to carry out comparative studies for the alternative use of available funds.

2.2. The Deliberative Appraisal Procedure

The DEVT allows the community itself to measure the shared social appreciation of the good through a direct, inclusive, dialogic and informed approach.

For several decades now, many countries have been involving communities in the various phases of the public decision-making process through direct democracy practices. Participatory and deliberative democracy are the most concrete cultural proposals in the reform processes of the oldest representative democracies; in many cases, the inclusion of citizens in policy making processes was introduced by decision-makers who were put under pressure by local communities; in others, inclusion was the result of cultural renewal fostered by the population itself. Given the recent increase in social tensions, disputes and discontent relating to a great many public decisions regarding territorial transformation, today inclusive processes are considered a useful instrument to manage all the stakeholders involved and to obtain their consent in a perspective of sustainable and shared choices.

In recent years, the inclusive procedure models that have been used more and more frequently are those based on the concept of deliberative democracy. The difference between deliberative democracy and democracy lies in the aggregative aspect (voting); in the former, deliberation is central to decision-making and all the stakeholders have the opportunity to participate without having to resort to a vote. The most innovative aspect is the importance given to the transformation of preferences during a discourse-based process through which the positions of the initial phase are transformed so as to take into account the viewpoint of others participants [4]. During the deliberation phase, through reasoned arguments, the participants try to convince each other until a shared decision is reached. The aim of deliberation is to raise awareness to enable people make decisions regarding collective interest. In fact, in deliberative democracy procedures, citizens do not participate in their own interest, they participate to ensure that the final shared decision stems from a progressively converging course of action. In this way, rather than being utilized simply as instruments from which individual preferences can be obtained, they can take part in a social process in order to construct collective judgements [5]. Therefore, to valuate a community good, we propose a deliberative appraisal procedure that combines deliberative methods, based on an informed discussion of a sample of the community, with stated preference methods (SPM), approaches to the economic valuation of a good based on individual respondents' statements about their preferences regarding hypothetical scenarios.

In the procedure we propose, the monetary valuation must be preceded by a deliberative phase that involves a random sample of citizens, defined as the valuation group (VG), statistically representative of the community in question (relevant population). The members of the VG are invited to state a preference related to the social importance they attach to the good based on informed and aware choices, to give their opinions and to discuss and even change them [6].

During a series of meetings, the members of the group are provided with the information necessary to enable them to discuss and state the social appreciation of the community good in question. In addition, they must be given the opportunity to ask experts and stakeholders questions in order to improve their knowledge, clarify doubts and express the different positions and viewpoints of the several players involved [7]. The value stated, therefore, is the outcome of a process of reflection and debate, the purpose of which is to form a group that is socially representative of the community with a long-term, better-informed and impartial viewpoint.

Compared to conventional approaches to monetary valuation, the DEVT results in a valuation that bestows greater social legitimacy on the outcome as it is less susceptible to bias of a cognitive nature while at the same time it is linked to the formation of a collective identity. In fact, conventional SPMs are prone to a series of biases relevant to the hypothetical nature of the answers. Bias is defined as the

difference between the distributions of hypothetical bids (or choices) obtained from a survey and the distribution of bids (or choices) that would be obtained in an actual demand revealing market setting [8]. Biases can stem from multiple sources including the composition of the sample adopted, the instrument utilized for the survey, influence exerted by the interviewers, the intrinsic hypothetical nature of SPMs, the strategic behavior of the interviewers and the type of information provided. Table 1 summarizes the main sources of biases [9–11].

On the other hand, in a deliberative appraisal procedure, the members of the VG are given much more time and information so they can make a well-pondered judgement and are less likely to give arbitrary answers. In addition, the dialogue, debate and comparison with other members of the group who have different viewpoints and interests, plus face-to-face interaction, tend to discourage strategic mechanisms. Lastly, as they are asked to state their preference in relation to a collective judgement, one can presume that the respondents' answers will be based on impartiality [12].

The aim of the DEVT is to specify a willingness to pay (WTP) shared by the entire VG. The participants valuate the good as citizens belonging to a community who, by means of the deliberative procedure, single out a series of values to share and a common identity to safeguard thanks to the sense of interdependence and belonging that develops within the group.

From an operational point of view during the first informative phase, all members of the VG have the opportunity to compare their initial viewpoint with that of the other members; they can then modify it once they become more aware of and have better understanding of the collective positions and interests involved. After the analysts provide the participants with essential information regarding the valuation process and the characteristics of the good in question, the VG draws up a list of experts and stakeholders to consult. During the consultation phase, the VG can speak with the experts and stakeholders to gain more insight regarding the good and to clear up any doubts they may have to ascertain the positions and viewpoints of the various players involved [7].

Table 1. Definition of biases in stated preference methods.

Bias	Description
Hypothetical	Participants fail to take questions seriously. Therefore, in the majority of cases, respondents overstate their WTP for an increase in the quality of a good or service.
Information	Respondents have little, if any, prior experience with the proposed change in the good or service. They also may make associations with other aspects that are not included in the scenario.
Strategic bias	Respondents may state a zero, positive or negative WTP because they want to protest some aspect of the scenario.
	Respondents provide specific answers in order to influence outcome.
Starting point bias	WTP anchored on initial state value.
Framing Effects	WTP depends on how the question is framed (negative or positive tone).
Yea-saying	Respondent tries to please the interviewer.
Nay saying	Respondent concerned to counter the interviewer.

If the information given to the VG is considered exhaustive, the valuation phase can begin; if not, the consultations can be repeated with the introduction of new experts and stakeholders if deemed necessary. During a deliberative session in the valuation phase, the objective of the VG is to agree on a shared WTP expressing the social appreciation of the good (Figure 1).

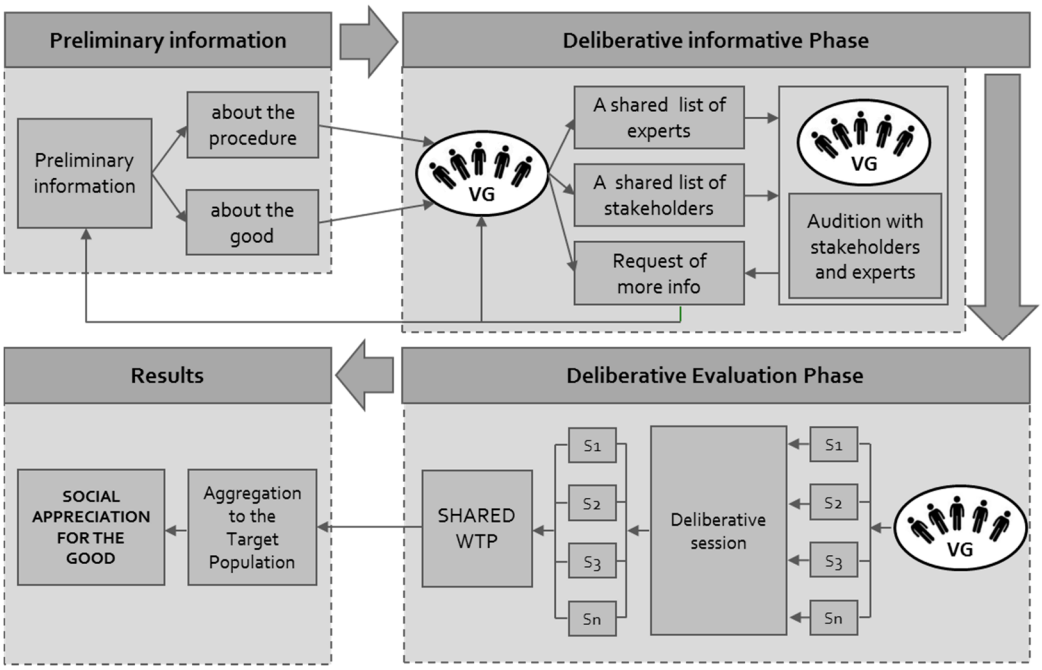

Figure 1. General scheme of the offered method.

The members of the VG are not asked to state their personal valuation but a value to attach to the good in terms of collective interest. In this perspective, it is essential to utilize what is defined as a "Kantian" or "deontological" approach to establish a shared value [13]. One of the key points of this approach is the fact that unwittingly, people often make decisions (even on simple everyday matters) that are dictated by values of a social, moral or political nature rather than by taking into consideration or seeking personal wellbeing. In Kant's approach, a choice must be free and equal for all and people should act only in accordance with that maxim through which they can at the same time will that it become a universal law; when individual reason and collective reason coincide, the result is the formulation of shared principles with which everyone can comply. Adopting this approach means pursuing a logic consistent with rules which are able to produce appropriate behaviors in the affected community, enhancing identities and roles of the subjects which belong to that context [14]. In deontological approach, the question can be summarized as: "what do we believe is appropriate for us as a society, given our shared principles, beliefs and commitments?" Answering this question, valuing subjects express their preference as citizens, reflecting principles the individual believes are implicit in the character, commitments, or identity of the community as a whole [5].

A DEVT differs from conventional approaches because the ethical legitimation of the WTP derives from the fact that it is acceptable to all participants [15]. The agreement is gradually reached through debate in the firm belief that discourse has a motivational force capable of resolving conflicts through shared social comprehension [16]. Through dialogue, a compromise between differing positions can be reached in the best interest for society as a whole [17]. Therefore, in this phase rhetoric plays a fundamental role, as it is an instrument capable of combining different positions by putting forth the most persuasive arguments.

3. A Case Study: The East Elevated Expressway of Rome

The "Tangenziale Est" of Rome is an expressway that connects the Foro Italico and Trionfale quarter in the north to the Porta Maggiore and San Giovanni areas in the south of the city. It runs for 16 km and consists of multiple road segments built in different periods. The first section, known as Via Olimpica, was built for the 1960 Olympic Games to connect Foro Italico (an Olympic venue) with Via Salaria. The General Town Planning Scheme developed in response to the demographic growth of the city in 1962 and the impact of new flows of urban inhabitants required a new road network and the continuation of the Olympic infrastructural artery down to the San Giovanni area. This axis, considered to be essential, was built by using road elevation in various sections due to the lack of available free space.

The experiment concerns a completely elevated stretch of the Tangenziale extending from the Verano Cemetery to Via dello Scalo San Lorenzo which, after crossing over the railway, forks into two sections (Figure 2). One goes southward (Via Castrense) and the other eastward, along Via Prenestina.

Figure 2. The East Elevated Expressway of Rome.

This section, built between 1962 and 1975, is about 2200 m long and is a dual carriageway with two lanes in each direction. The roadways overhang laterally and are based on reticular steel beams of approximately 20 m long, supported by 150 cement pylons with a circular section. The height of the road surface varies from 5 m (Via Scalo San Lorenzo), to 20 m or more in the section that passes over the railroad and forms the multi-level interchange at Via Prenestina. The infrastructure fits into a consolidated urban fabric and passes through important macro functional areas with infrastructures such as a General Hospital, the University City, the Verano Cemetery, the railway connecting Rome's two main stations (Termini and Tiburtina) and the San Lorenzo, Prenestino and Pigneto neighbourhoods.

In the sections where the elevated road runs very close to residential buildings, the distances between the windows and the road range from a few meters to approximately 30 cm (Figure 3).

Figure 3. The relation between the road and residential buildings.

While the infrastructure served Rome's mobility efficiently in the early years, the complex problem of its relationship with the buildings—already evident only a few years after the road came into use—is undoubtedly much worse today due to new environmental and social problems. The very intense vehicular traffic, often with jams, is the cause of the problems that the local residents mainly complain about, *i.e.*, loud and discontinuous noise and air pollution (carbon monoxide, unburned hydrocarbons and nitrogen oxides) that makes the buildings in the vicinity of the infrastructure virtually unfit for living as windows have to be kept closed. Moreover, the structure of the elevated sections greatly reduces the amount of natural light in both the apartments below road level and those at the same level as the main beams. The streets below the elevated road are permanently in shadow and have large unfrequented and abandoned spaces that are the cause of various urban decay problems. Finally, the structure is showing clear signs of obsolescence, so much so that it requires major restoration work in many parts.

In 2008, the City of Rome's Town Planning Department identified as a solution to this complex problem the demolition of the elevated section of the Tangenziale, with the consequent diversion of mobility towards a new road tunnel, and the general regeneration of the surrounding neighbourhoods. Since then, the elevated expressway has been gradually falling into disuse. In 2009, an Urban Planning Scheme envisaged the regeneration of the San Lorenzo and Castro Pretorio neighbourhoods and, as regards the mobility system, indicated a new alternative route for the Tangenziale.

Although this solution seemed suitable to solve the many problems associated with the elevated road, the idea of removing the structure did not receive unanimous consent as expected. Indeed, several

spontaneous citizen movements strongly questioned the need and opportuneness of demolishing the entire structure. One of these movements, the "Friends of the Monster" association, proposed a project, inspired by the High Line scheme in New York (Figure 4), based on converting the structure into a public park. The pillars would be used as a vertical path for free climbing, and at the highest point a small square for special events would be created [18].

Figure 4. The Highline of New York [19].

After a number of events, workshops and conferences [20], the idea of converting the elevated road into a linear park slowly gained consensus. The park would offer urban green spaces, small services, panoramic pedestrian and cycling tracks, urban gardens and the like, thus creating an attractive urban object to be used and enjoyed by the people. The recurring idea is a roof park (obtained by modifying the asphalt layer in a container of topsoil), with different access points like hydraulic lifts, stairs and renovated existing ramps. The park would be a green corridor connecting the various parts of the city; in order to create a green barrier, native plants and creepers would be planted, and the utilization of special nest boxes would encourage the nesting of both migratory and sedentary avifauna [21]. The energy required for the park would be produced through renewable sources. Finally, following the most innovative experiences of urban agriculture in metropolitan area [22], a recent proposal concerns the conversion of the Tangenziale into an agronomic garden, 2 kilometres long and 20 m wide (Figure 5). The project includes areas for the cultivation of vineyards of grape varieties typical of the Roman territory, and for growing 16 kinds of apples in the "Apple Tree Orchard"; the wine, vinegar and jams produced would be tasted in dedicated areas. The "Shared Gardens" would be managed directly by schools and "Grandparents' and Grandchildren's Gardens" would be created for families. A "Zero Kilometre Market" would allow the population to benefit from the produce grown in the park. A conference area would be located on the ramps and, finally, sports fields, a skate park and a bike path with a bike sharing service would be created. The targets of this proposal are environmental protection,

social inclusion, sustainable mobility, the promotion of entrepreneurship, new ideas and businesses, and the development of new forms of employment. The agronomic garden would generate a unique cognitive, visual, tactile and emotional experience [23].

The aim of the experiment we are about to propose here, designed as part of the experimental evaluation workshop [24,25], is to verify to what extent, if any, does the community attach social importance to the idea of keeping the infrastructure and converting it into a linear public park.

4. Measuring Social Appreciation for Sustainable Regeneration: An Experiment for the East Elevated Expressway of Rome

4.1. Sampling Design

The first phase of the experiment consisted in singling out the sample that would represent the VG by means of the sampling design.

The target population from which the sample was to be selected was the entire adult population residing in the Municipality of Rome (2,106,004 individuals). As the objective of the experiment was the measurement of the shared social appreciation of the good, which goes beyond simply measuring its direct and/or indirect utility, it was necessary to take into consideration a particularly large target population. The "Tangenziale Est" is an infrastructure of paramount importance for Rome's mobility; therefore, the people who might be interested or directly and/or indirectly involved in the regeneration project are neither only those who live near the expressway, nor those who use it every day. Furthermore, as it is a municipal infrastructure, the costs of implementing the project would impact on Rome's entire population. Once the target population had been defined, a stratified sample composed of 30 adult inhabitants of Rome was designed.

Generally, the number of people in the sample group for experimentation in the field of discourse-based valuation ranges from 15 to 30 [26,27]. Small groups are used since it is common knowledge that in any deliberative process the quality of communication is negatively affected by the size of the VG—the larger it is, the harder it is to come to true deliberation. Beyond a very small number, deliberation breaks down with speech-making replacing conversation and rhetorical appeals replacing reasoned arguments [28]. Moreover, small groups prevent those who already have power and resources from participating and they foster the participation of people who find it more difficult to organize themselves collectively or, those less endowed with material resources and political power. In addition, the limited size of the sample generates the typical dynamics of small "psychological groups" such as a sense of interdependence and belonging [12]. These lead to the singling out of a series of values to share, and a common identity to safeguard, and the participants are able to valuate the common good as citizens belonging to a community and not simply as consumers [5].

Since the objective of deliberative evaluation is to obtain a group that socially represents the citizens that go to form a community, a socio-demographic survey was conducted to find the main characteristics of the adult population of the Municipality of Rome from which the VG was to be composed. The socio-economic characteristics taken into consideration were residence, gender, age, educational qualification, profession and income bracket, based on the data specified in the following Tables 2–6.

Table 2. Socio-economic characteristics of the population of Rome: age.

Age	Total	Male	Female
18–34 years	25.47%	12.59%	12.88%
35–49 years	27.40%	13.17%	14.23%
50–64 years	24.10%	11.09%	13.01%
65 years and more	23.03%	9.34%	13.69%
Total	100.00%	46.19%	53.81%

Table 3. Socio-economic characteristics of the population of Rome: educational qualification.

Educational Qualification	Total	Male	Female
Graduate	17.25%	8.62%	8.63%
High school	39.51%	18.73%	20.79%
Junior high school	24.66%	12.40%	12.26%
Primary school	15.30%	5.61%	9.69%
Literate	2.66%	0.59%	2.06%
Illiterate	0.62%	0.19%	0.43%
Total	100.00%	46.13%	53.87%

Table 4. Socio-economic characteristics of the population of Rome: profession.

Profession	Total	Male	Female
Entrepreneur or freelance	4.22%	2.85%	1.37%
Self-employed	5.17%	3.75%	1.42%
Employee	36.26%	19.29%	16.96%
Unemployed	3.84%	1.87%	1.97%
Housewife	16.57%	0.00%	16.57%
Student	8.36%	4.11%	4.25%
Retired	17.85%	10.53%	7.32%
Other	7.73%	3.84%	3.90%
Total	100.0%	46.2%	53.8%

Table 5. Socio-economic characteristics of the population of Rome: income.

Income	Total	Male	Female
Under 7.500 €	14.1 %	9.9%	18.3%
Between 7.500 and 15.000 €	16.3%	11.4%	21.2%
Between 15.000 and 30.000 €	43.6%	47.6%	39.6%
Between 30.000 and 70.000 €	20.5%	23.3%	17.7%
Over 70.000 €	5.5%	7.80%	3.2%
Total	100%	100%	100%

Table 6. Socio-economic characteristics of the population of Rome: residents in municipalities.

Municipality	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**
% residents	4.36	4.42	2.01	7.24	6.62	4.67	4.49	7.07	4.73	6.45	4.97
Municipality	**XII**	**XIII**	**XV**	**XVI**	**XVII**	**XVIII**	**XIX**	**XX**	**No located**	**Total**	
% residents	5.78	6.93	5.50	5.22	2.67	4.81	6.36	5.22	0.49	100.00	

First of all the target population was subdivided in subpopulations (strata), as homogenous as possible in terms of socioeconomic characteristics. Subsequently, by simulating a simple random sampling procedure, a sample for each stratum was extracted; and lastly, by joining the subsamples the total sample was obtained. The group was composed of 14 men and 16 women; 8 aged between 18 and 34, 8 between 35 and 49, 7 between 50 and 64 and 7 were over 65. The socio-demographic characteristics of the sample that represented the VG can be found below in Table 7.

Table 7. Socio-demographics characteristics of the valuation group.

No.	**Profession**	**Age**	**Educational Qualification**	**Gender**	**Income**	**Municipality**
1	Entrepreneur	35–49 years	High school	Male	>70.000 €	XVII
2	Freelance	35–49 years	Graduate	Female	30.000–70.000 €	I
3	Self-employed	50–64 years	Primary school	Male	15.000–30.000 €	XIX
4	Self-employed	35–49 years	Junior high school	Female	30.000–70.000 €	X
5	Employee	35–49 years	Graduate	Male	30.000–70.000 €	VI
6	Employee	35–49 years	Graduate	Male	>70.000 €	XIII
7	Employee	50–64 years	Junior high school	Male	15.000–30.000 €	II
8	Employee	20–34 years	High school	Male	15.000–30.000 €	XII
9	Employee	35–49 years	Graduate	Male	30.000–70.000 €	XVIII
10	Employee	50–64 years	Primary school	Male	15.000–30.000 €	V
11	Employee	35–49 years	Graduate	Female	30.000–70.000 €	XV
12	Employee	50–64 years	High school	Female	15.000–30.000 €	VII
13	Employee	18–34 years	High school	Female	15.000–30.000 €	XVI
14	Employee	50–64 years	High school	Female	15.000–30.000 €	XI
15	Employee	50–64 years	Junior high school	Female	15.000–30.000 €	IV
16	Unemployed	18–34 years	Junior high school	Male	<7.500 €	VIII
17	Unemployed	18–34 years	High school	Female	<7.500 €	XX
18	Housewife	18–34 years	Junior high school	Female	7.500–15.000 €	XVI
19	Housewife	35–49 years	High school	Female	7.500–15.000 €	V
20	Housewife	50–64 years	Primary school	Female	7.500–15.000 €	X
21	Housewife	65 years et more	Primary school	Female	7.500-15.000 €	XIX
22	Housewife	65 years et more	Literate	Female	7.500–15.000 €	III
23	Student	18–34 years	High school	Male	<7.500 €	XII
24	Student	18–34 years	High school	Male	<7.500 €	IX
25	Student	18–34 years	High school	Female	7.500–15.000 €	XIII
26	Retired	65 years et more	Junior high school	Male	15.000–30.000 €	XI
27	Retired	65 years et more	High school	Male	30.000–70.000 €	IV
28	Retired	65 years et more	High school	Male	15.000–30.000 €	XV
29	Retired	65 years et more	Primary school	Female	15.000–30.000 €	XX
30	Retired	65 years et more	Junior high school	Female	15.000–30.000 €	IX

The experimental application of the proposed DEVT has been conducted in academic context, within the Laboratory of Experimental Evaluation of the University of Rome "La Sapienza." Through a role-playing game, 30 students interpreted the members of the VG (selected through the stratified sample design) and simulated their characteristics and behavior.

Keeping to the mechanisms of role-playing games, initially the experimental designers described the setting and the characteristics of the individuals to the students who had offered to take part in the simulation. Each member of the VG was described in fact sheets that took into account the socio-economic characteristics specified in Table 7. To make it easier for the students to interpret their character and to ensure maximum plausibility, the roles were assigned according to what the students themselves considered their aptitude and capacity to identify themselves with their character.

Initially, the students taking part in the simulation had to interpret their character consistently with the profile described in the fact sheet and the setting. Then, through discourse and exchange of logical arguments, the characters were able to modify their initial positions and viewpoints, taking into account the opinions stated by the other members of the VG and the information acquired during the experimentation.

4.2. Experimental Design

Once the sample had been defined, the construction of the valuation scenario began, *i.e.*, the descriptive model of the external factors that influence the value of the expressway's characteristics and relationships [29]. Initially information regarding its current state was identified, then, through the utilization of images, diagrams and simulations, the hypothetic valuation scenarios were constructed and selected according to feasible implementable alternatives. For each single scenario, the following factors were specified: (a) characteristics, modalities, and how much time and money would be needed to implement the project; and (b) an initial identification of possible impacts between its current state and the changes that would stem from the implementation of the project.

Two scenarios emerged:

- Demolishing the elevated expressway followed by the reorganization and regeneration of the razed area—a solution corresponding to the intentions of the Rome Council;
- Not demolishing the elevated expressway but converting it into a public recreation and leisure area—a solution based on suggestions proffered by various citizen associations.

Given that the first scenario would be implemented even without the social sharing factor, it was decided to give importance to the social appreciation regarding the second scenario—conserving the infrastructure.

The next step was to define the payment modalities: it was decided to ask for the WTP through voluntary individual monthly payments for a ten-year period, and possibly to create a specific fund that could be administered directly by the community. In fact, a request for a tax could have impacted negatively on the WTP, thus leading to a large number of answers to be considered null and void or not worth taking into account [9], considering both the lack of trust that the community has in the public administration and the already high local taxes.

The choice of a multiple year payment as opposed to a lump-sum payment was dictated principally by two reasons: firstly, because smaller sums of money paid in instalments spread over time enables

more people to contribute and prevents the exclusion of poorer families for reasons linked to family budget issues; and secondly, because estimates that use a lump-sum payment system tend to be lower than those envisaging smaller payments spread over a number of years [30]. A ten-year period was chosen above all in relation to the projected period for the regeneration scheme, but also for its suitability in terms of experimentation. Several experiments [31,32] have confirmed that generally speaking people pay the initial instalment and normally continue paying for a limited number of years; on the other hand, they are less inclined to commit themselves to long-term payments. In fact, in these cases, some people may decide they are no longer obliged to pay the annual sum and, at a certain point, they feel the need to renegotiate their WTP. According to Kahneman and Knetsch [30,33] after a certain number of years has passed, people are willing to pay the same amount of money annually regardless of the number of years originally established for the payments.

For the elicitation modality, the open ended contingent valuation method was chosen, as in small-group deliberative processes, the utilization of techniques that require considerable statistical data processing is not recommended. In fact, the limited amount of data obtained from the participants is neither reliable nor statistically significant. Furthermore, the use of the open ended version makes it possible to trigger an interactive and iterative process to determine WTP that takes into account the level of consensus achieved in the group.

Once the evaluation scenario and the elicitation modality had been defined, it was decided to divide the experiment into three separate meetings: (1) the first when the VG, after receiving the most important information regarding the valuation process and the characteristic of the intervention, draws up a list of experts and stakeholders to consult and fills out the first orientation questionnaire; (2) the second during which the VG consults the experts and stakeholders; and (3) the third with the aim of valuating the project by means of a WTP agreed on by the whole VG.

4.3. Conducting the Experiment

During the first meeting, the VG received the information necessary to clarify the purposes, roles and tasks related to the various phases of the valuation process. Subsequently, they were given the most important information regarding the valuation factors: the history of the elevated expressway, the road's current conditions (use, traffic, times, etc.) and the major problems. The initial information provided was unbiased regarding the following: (a) the current status of the expressway, problems and criticality level; (b) the intentions of the Rome Council (demolition and regeneration of the adjacent areas); and (c) several suggestions regarding not demolishing but converting the infrastructure based on images of similar schemes implemented in New York and Paris.

As foreseen for all major deliberative processes, the initial informative material had already been examined by the possible stakeholders and experts representing the different positions regarding the elevated expressway's future.

During the second phase of the first day, every member of the VG was given a questionnaire to fill out individually to ascertain the existence of a WTP not to demolish the expressway and to convert it into a linear public park. The questionnaire was divided into 5 sections:

- Section 1. The respondent's knowledge and familiarity with the topic to be valuated. The aim was to ascertain the respondent's viewpoint regarding the general questions related to the elevated expressway, how the respondent uses it and to understand the level of familiarity.
- Section 2. Explanation of the reasons for conducting the survey.
- Section 3. Definition of the valuation scenario through a brief description of the expressway's current status and the introduction of the hypothesis for its regeneration with the support of a series of images.
- Section 4. Indications regarding the payment and WTP elicitation methods through a question formulated as follows:
  "Based on the importance you attach to the expressway regeneration scheme and according to the modalities described during the presentation, if you were to contribute economically towards conserving the structure and converting it into a recreation and leisure park, what is the maximum amount of money you would be willing to pay monthly for a ten-year period?"
- Section 5. Supplementary questions to understand the reasons behind the WTP declared, and to obtain information on the respondents' socio-economic characteristics, their attitudes, knowledge and habits.

The results of the questionnaire showed that 50% of the VG were not willing to contribute towards conserving the structure and converting the elevated expressway (see Figure 5).

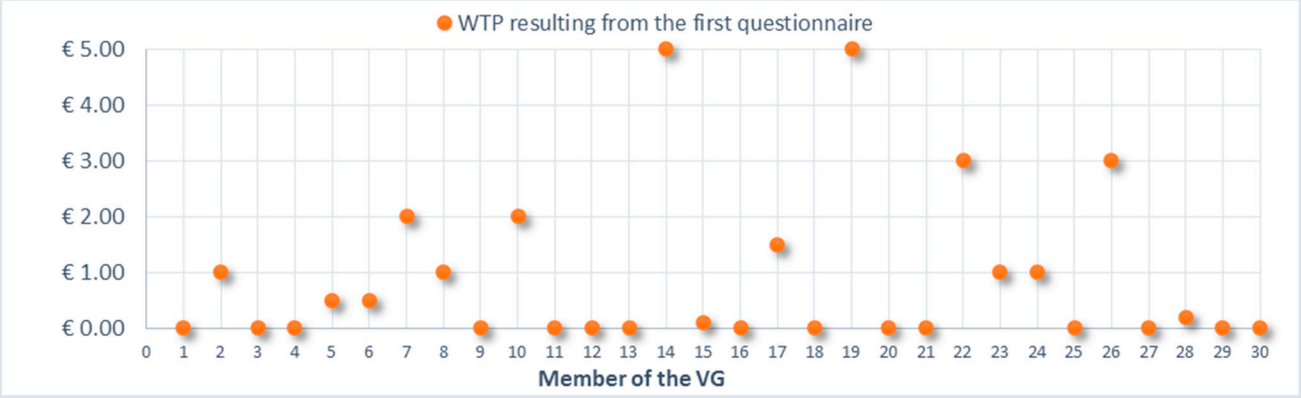

Figure 5. WTP resulting after the first questionnaire.

The last phase of the first day was dedicated to drawing up a list of experts and stakeholders who would be at the disposal of the VG throughout the deliberative process. In order to convince those who were not overly enthusiastic about becoming involved, the VG was split into two subgroups each of which compiled their own list; subsequently, during a plenary session a final list was approved. The stakeholders included inhabitants, shopkeepers and businesses in the area, financial developers and the public administration. For the subject matter expert, the VG chose a project technician who was an expert in cost control and urban mobility projects.

The second day was entirely dedicated to interviewing the stakeholders and the expert. The VG listened to what they had to say about their position and the reasons behind their position on the matter at hand. Each interview was structured and performed in exactly the same way: (a) firstly, each stakeholder submitted a report regarding his/her personal interest in the scheme, his/her position and the

reasons behind his/her position; (b) the VG then had about 20 min to compile a list of questions for the stakeholder; and (c) lastly, the VG listened to the answers provided by each stakeholder intervening with doubts and further questions when deemed necessary. The expert's interview was structured and performed in the same way. The material and information submitted by the stakeholders and the expert were pre-emptively reviewed by all those involved in the interviews.

The position of the stakeholders and the expert can be found in Table 8.

Table 8. Positions of the stakeholders.

Stakeholders	Position
Neighbourhood inhabitants	Conversion: The regeneration of the abandoned area is the best solution; demolition could be too costly and would solve only some of the area's problems; converting the structure would create new green spaces, cycle paths and services for the neighbourhood.
Inhabitants overlooking the elevated expressway	Demolition: The apartments overlooking the Tangenziale are unfit for living in due to lack of light, smog and noise; damage suffered for too many years; trade without the Tangenziale would improve; property values would increase; the conversion scheme would lead to problems linked to privacy, safety and noise at night.
Shopkeepers	Conversion: The park would attract people and consequently trade would increase. Demolition: Areas always in shadow and urban decay under the infrastructure.
Businesses in the area	Conversion: The creation of spin-off activities for those already existing, new recreational, tertiary activities *etc*.; increase in property values in the area; advantages and benefits for a greater number of people.
Public Administration	Demolition: Maintaining the converted structure could prove to be costly; scepticism regarding the functionality of the conversion scheme; lack of funds and financing for the conversion scheme.
Expert	**Position**
Expert in Urban Mobility and Cost Control	Neutral: Mobility problems solved through a road tunnel; problems linked to the disposal of demolition debris; conversion costs about 35% higher than demolition costs.

The purpose of the third and final meeting was to establish a shared WTP, based on the awareness of the social importance of conserving the elevated expressway and converting it into an urban park with a series of facilities.

Following the request to formulate a shared WTP, the VG began to discuss a possible sum. After a discourse-based phase, during which key comments taken from the interviews were called into question, each member of the VG was asked to express what they thought would be a possible shared WTP backed by their reasons. The updated statements were shown on a screen in real time.

The outcomes of the first round of statements showed that preferences had undergone considerable modification compared to the individual questionnaires filled out at the start of the process. In fact, in the first questionnaire, 50% of the VG had stated a WTP = 0, demonstrating an unwillingness to contribute towards acknowledging the social importance of the scheme. The first effect of the interviews with the stakeholders and expert was a drop in the number of people expressing this position—only 4 people (about 13%) confirmed they were unwilling to pay, while 13 people increased the value of their WTP.

The WTP is mainly concentrated in a range going from 0.10 € to 2.00 € with a few exceptions regarding 4 people who declared a WTP = 3.00 € (two of which confirmed the amount declared in the first questionnaire) and 2 who confirmed a WTP = 5.00 €, expressed in the first individual questionnaire. The main factors in favor of conserving the infrastructure proved to be decisive and included that it would help to enhance the city and its image, the possibility to attract tourists, that it would be easy to organize events linked to the regenerated structure and the assurance that any possible inconvenience for those living near the infrastructure would be eliminated. The relationship and the shift in preferences between the first individual questionnaires and the statements made at the start of the deliberative phase can be found in Figure 6.

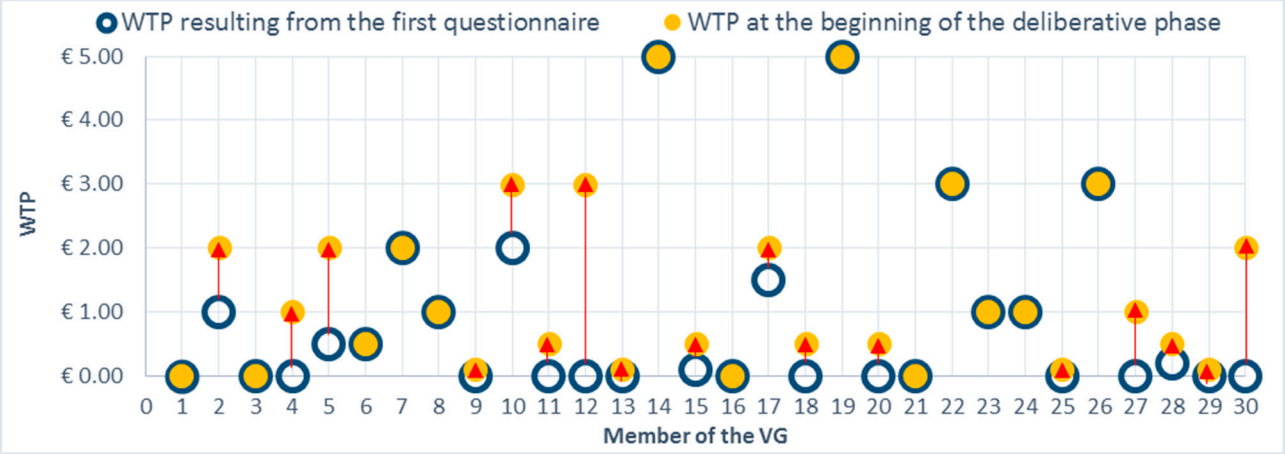

Figure 6. Stated WTP and shift in preference at the beginning of deliberative phase.

From the beginning of the final deliberative phase, the members of the VG were free to discuss, propose, and put forward any theory in support of a particular sum of money among those that had emerged during the first declarations or in support of new amounts to propose. When the discussion started to become repetitive, the moderators invited the single members of the group to explain the reasons behind their change of preference or to confirm their declaration. Particular attention was paid by the moderators to ensure that everybody expressed their opinion to prevent mechanisms of self-exclusion and to avert the creation of dominant leaders within the group.

Every time the group or the moderators deemed it opportune, each member of the group expressed his/her opinion that was summarized and shown on a screen in the meeting room. In this way, everybody was fully aware of the consensus level of the amounts declared, as well as the "alliances" that were formed. The final deliberation before obtaining a shared WTP lasted 120 min. The summarized picture of the evolution of the WTP in these 120 min can be found in Figure 7.

The first 30 min were dedicated almost entirely to two things; the first, solved fairly rapidly, concerned the argumentation necessary to acknowledge the WTP = 5.00 € as an extreme position, neither shared nor sharable. The second concerned the attempt to persuade those who continued to confirm a WTP = 0 (4 people) to modify their position. The reasons advanced by the supporters of a WTP = 0 were closely linked to the reasons and impressions expressed by the resident stakeholders who preferred the demolition of the Tangenziale, and the position of the local administration that had expressed doubts regarding costs related to the maintenance of the park. The rest of the VG believed that the creation of a

linear park would improve the position of the residents who were against the scheme—a small minority compared to how many would enjoy and benefit from the structure. After 30 min, the VG was asked once again to express positions and reasons behind the relative shifts in preference. This time, 5 preference shifts were noted of which two were downward shifts of the WTP= 5.00 € and one was an upward shift from a WTP = 0 to a WTP = 1.00 €.

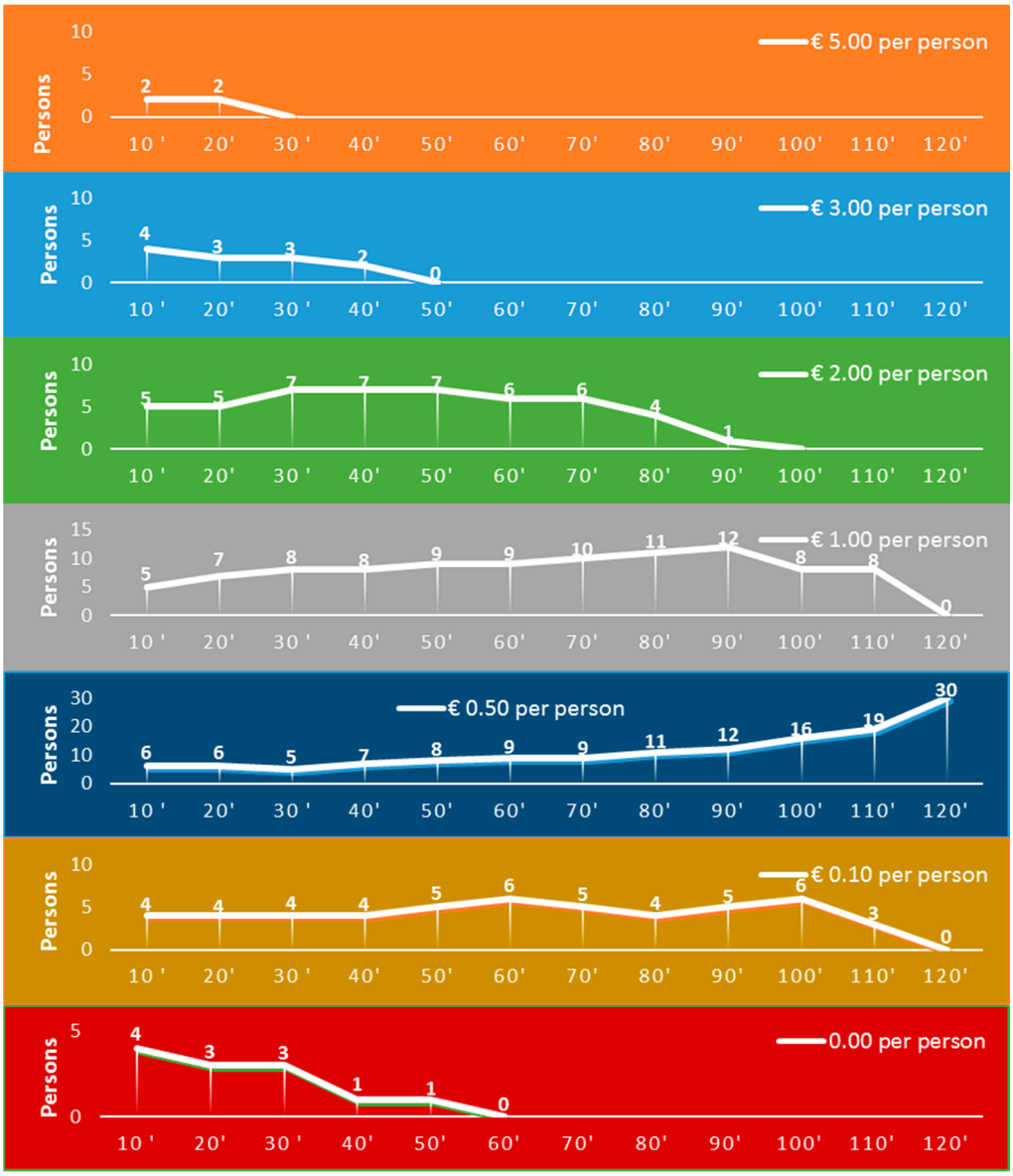

Figure 7. Trend of WTPs during the 120 min of deliberation.

The outcomes of the first 30 min can be consulted below in Figure 8 that summarizes the shifts of the positions in terms of both the people in question and the deliberation time.

After another 20 min, the group was nearer to agreeing on the amount for a WTP. The group managed to convince the supporters of a WTP = 3.00 € (3 people) that this amount was too high; the insistence of the importance of coming to an agreement on a shared amount was decisive at this point. The recurring mention of the reasons behind the expert's and stakeholders' wish not to demolish but to convert the structure left only one person still supporting a WTP = 0 position. After further declarations followed by

the projection of the results (Figure 9) the values were grouped in four main clusters: WTP = 2.00 €, WTP = 1.00 €, WTP = 0.50 € and a few WTP = 0.10 €.

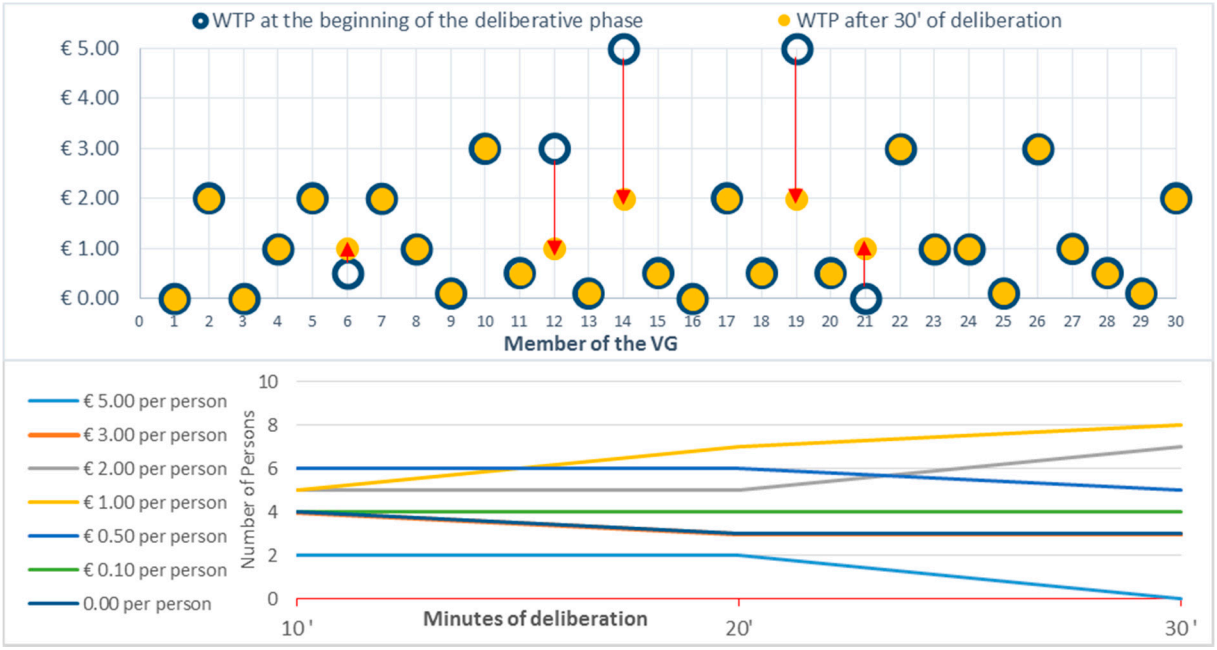

Figure 8. Stated WTP after 30 min of deliberation.

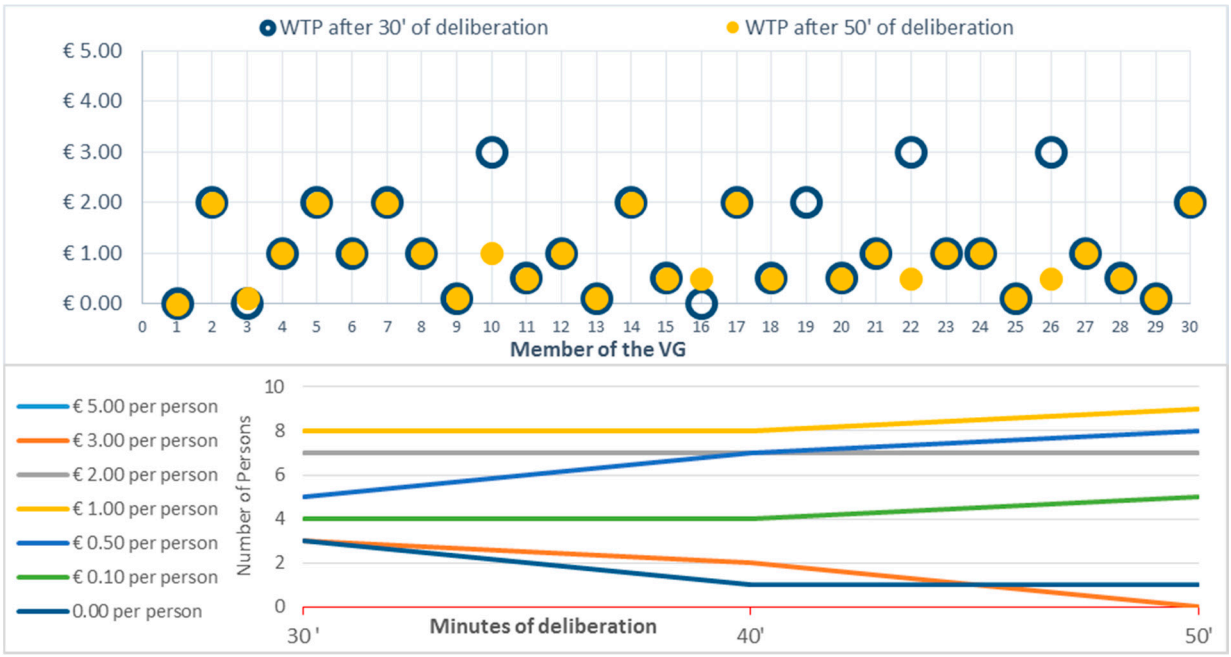

Figure 9. Stated WTP after 50 min of deliberation.

Another 50 min were necessary to achieve a clear polarization of the WTP; the group that supported the WTP= 2.00 € was persuaded to choose the WTP = 0.50 €. The argumentation was based on the fact that the shared amount must be considered fair by all those who would have to pay it but that anyone who so wished could pay a larger sum. After the new declarations (Figure 10) the WTP = 0 position disappeared completely and there emerged a trend towards the polarization of WTP = 1.00 € and WTP = 0.50 preferences. The WTP = 0.10 € position, was still marginal.

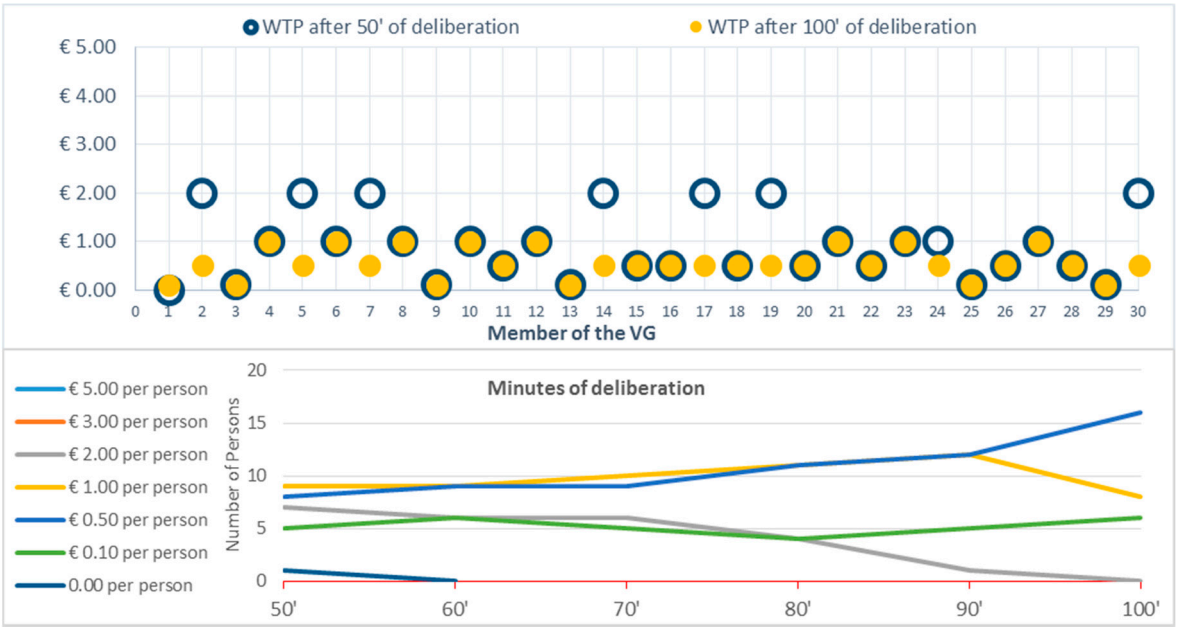

Figure 10. Stated WTP after 100 min of deliberation.

The last 20 min (Figure 11) were almost completely dedicated to explaining the reasons behind the decision to support the WTP = 1.00 € and WTP = 0.50 € preferences. For the supporters of the former, the minimum psychological threshold of 1.00 € was an easily sharable amount; this amount was strongly supported by those who initially had expressed a higher preference and who clearly were unwilling to drop below 1.00 €. The supporters of the WTP = 0.50 € considered 1.00 € too much, and they also underlined that initially they had expressed a higher amount. The fear of not coming to an agreement and the explanation that nobody could prevent a person from offering a higher amount personally if he/she so wished were the arguments that mainly convinced the VG to agree unanimously on a shared WTP of 0.50 €, to be paid monthly for a ten-year period.

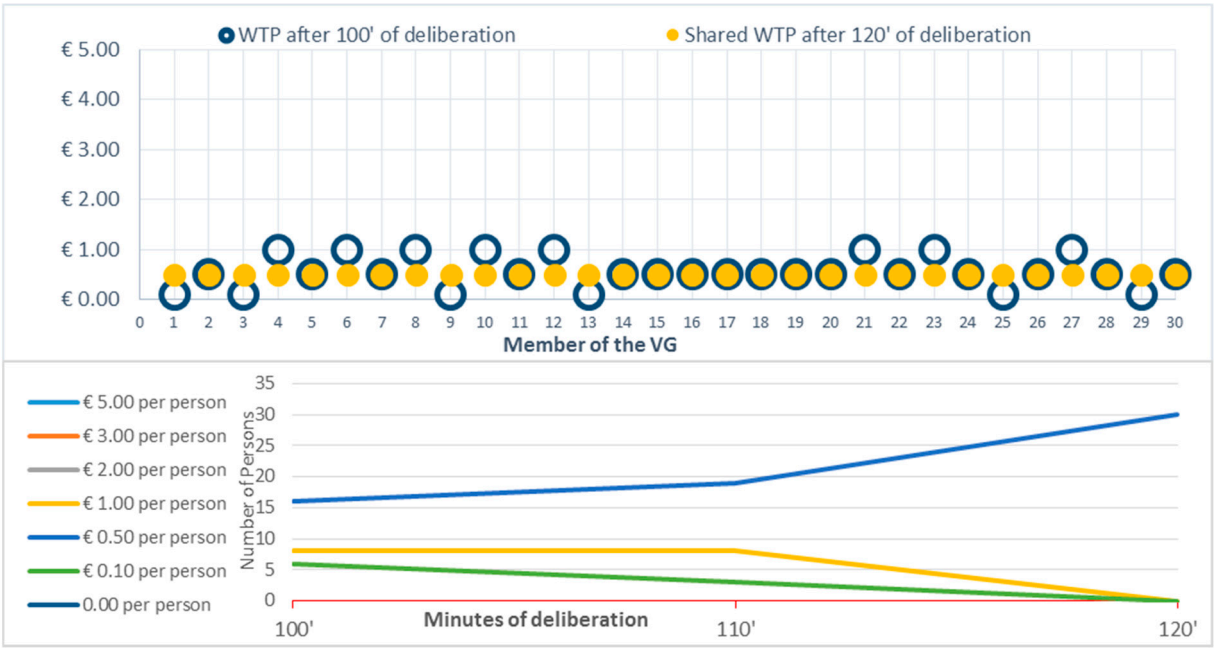

Figure 11. Shared WTP after 120 min of deliberation.

5. Results and Conclusions

The analysis of the outcomes of the experiment were conducted from two different angles. The first was related to the outcomes that emerged from the application of the process and the ensuing monetary value of the social appreciation; the second, linked to the methodological control that was possible to perform on the designed process, with the ensuing formulation of improved and/or integrated proposals. It is important to underline, however, that at the present stage of the research project, and taking into account that these deliberative monetary valuation processes, particularly in the field of urban transformation, are innovative techniques, the results of a methodological nature are to be considered more important than the monetary value derivable from their application.

As regards the WTPs expressed, the first outcome to highlight is how the VG changed its opinion during the process; in fact, 50% of the group did not express a WTP for the conservation and conversion of the elevated expressway during the first orientation questionnaire. This position was motivated mainly by a preference towards the option of demolishing the infrastructure, while, to a lesser extent, it was based on an unwillingness to contribute economically to any project whatsoever concerning it. In short, almost half the VG were not inclined to attach social importance to the elevated expressway.

The discourse-based-deliberative phase, during which the members of the VG spoke with the stakeholders and the expert, played a crucial role in the shift of their preferences towards the shared position to conserve and convert the elevated expressway. At the end of the process, they acknowledged the social importance of converting the elevated expressway, and they came to an agreement on a shared WTP (WTPs).

As yet, the WTPs (50 Euro cents monthly for 10 years), is an incomplete factor; to obtain the overall social appreciation estimate, the WTPs must be added up and implemented (WTPA) by calculating the initial accumulation (Ai) of a series of limited fixed annuities (1) in which a represents the annual amount, i corresponds to the social discount rate, and n is the discounting period.

$$a\ \frac{(1+i)^n - 1}{i\ (1+i)^n} = A_i = WTP_A \quad (1)$$

Utilizing a social discount rate of 3% (provided by the EU in "Implementing Act On The Guidance for the Methodology for the Cost-Benefit Analysis of Major Projects"), a 10-year implementation period and an annual amount of 6 € (corresponding to the WTPS for a year), the implementation outcome is equal to 51.18 € per person.

The WTPA spread over the entire target population (2,106,004 individuals) yields an overall social appreciation (OSA) value of 107,787,848 €. This amount represents the share of integrated financing that the community in question could offer once it has acknowledged the social importance of the collective good. The amount could be raised by using various dedicated taxation instruments or the issuance of project bonds.

Considering that to cover the demolition costs of a 450-metre stretch of the elevated expressway, the Rome Municipality earmarked an initial sum of 9,000,000 million Euros (Rome Municipality Council Minute n. 45/2014, available at www.comune.roma.it), the costs for demolishing the entire 2200-metre stretch would be somewhere in the region of 44,000,000 Euros, to which the costs of constructing the road tunnel and regenerating the surface area must be added. The costs to convert the infrastructure into

a park (estimated according to a quick calculation carried out with the expert involved in the experiment) would be between 60 and 80 million €. The acknowledgment on the part of the community of the social appreciation of converting the Tangenziale into an urban linear park, translates into the need for an extra financial resource of over 100,000,000 €, an amount that could cover at least part of the costs for the construction of the road tunnel and the regeneration of the surrounding area.

Through the experiment described in this paper, based on a role-playing game, it was possible to verify the appropriateness of the DEVT in measuring the social appreciation a community would express for the regeneration project.

Considering the high cost required to draw a sample of participants based on real population and the long time that the survey would have required (both unbearable by the research group), the experiment was conducted through a Role Playing Game with undergraduate students. This is a common practice in experimental laboratories of economics, because students are more available to be involved and express curiosity and interest in taking part in experiments. Several scientific studies have compared the outcomes with students and real people, confirming the reliability of the results obtained with students [34]. The skill of a group of students in performing the behavior of a sample of real population has been enhanced by the following elements: (a) an intensive and deep information system, useful to study the role; (b) a long period of training, essential to perform the role. At the end of the experiment many students pointed out that, performing the role, their behavior was not completely fictional but was referred to people close to them (parents, relatives, friends and acquaintances) interested in the question discussed. When a student showed behaviors clearly unrelated with his role (for distraction or fatigue), the facilitators of the deliberative process invited him to ponder on performance more congruent. Finally, in a deliberative experiment, an undergraduate at the end of his academic career is a reliable subject thanks to his skills in adapting to contingent situation and in processing new information; his basic knowledge and critical approach make the student an ideal subject to play the role of a thinking and valuing citizen.

The deliberation and consensus obtained during the experiment showed that this is an appropriate path to follow for the valuation of a collective good; in fact, the participants formulated a collective valuation higher than the aggregation of their single preferences. Thanks to a series of discussions, they managed to build preferences on the collective good that differed from the initial ones and to come to a debated consensual judgement.

In this context, the participants' valuation was not based on how their choices effected them in terms of private self-interest, but on their value and convenience for the community as a whole. The discourse-based method applied enabled the participants to come to an informed and well-deliberated value judgement. The result was a stronger outcome, less biased at a semantic level, and more reliable than outcomes obtained through more traditional surveys, as the participants could change their preferences after discussing them with each other. In addition, in the DEVT adopted, the ethical legitimization of the WTP was not provided at an individual level, but was approved by all the participants through a democratic pluralist process.

The DEVT proposed adopts a monetary scale as a tool to measure the shared social appreciation of a community good. Monetary measure is adopted to express the economic value of an inclusive good, considering that money is fungible, divisible, can be used in discrete amounts and allows proper comparisons. In the DEVT, the monetary scale does not express the significance of the environmental

dimension of the good, nor is aimed at appraising its market value. On the contrary, the monetary scale is intended to quantify the value that the members of a community attach to the good depending on the total importance assigned to it.

This experiment highlighted to what extent the informative phase influences decisions taken subsequently during the valuation phase. Therefore, to improve the process proposed, the first phase must be planned carefully, and enough time must be allowed to interview as many stakeholders and experts possible including those with contrasting positions. Through further experiments, it will be possible to improve the DEVT. Deliberation valuation experimentation, with its innovative methods regarding participation in civil life, makes public choices sustainable, more democratic, gives more importance to citizens' self-determination, and measures the estimated value that a community attaches to collective goods and social projects.

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Author Contributions

All authors were involved equally in designing and conducting the experiment. All authors wrote the paper; they read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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